



US006298092B1

(12) **United States Patent**  
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(10) Patent No.: **US 6,298,092 B1**  
(45) Date of Patent: **Oct. 2, 2001**

(54) **METHODS OF CONTROLLING  
COMMUNICATION PARAMETERS OF  
WIRELESS SYSTEMS**

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(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: 09/585,948

(22) Filed: Jun. 2, 2000

**Related U.S. Application Data**

(63) Continuation-in-part of application No. 09/464,372, filed on Dec. 15, 1999.

(51) Int. Cl.<sup>7</sup> ..... H04B 7/06; H04B 7/08

(52) U.S. Cl. ..... 375/267; 375/299; 375/347; 455/69; 455/101; 455/102; 455/272

(58) Field of Search ..... 375/216, 267, 375/299, 347; 455/69, 101, 102, 135, 136, 272

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(57)

**ABSTRACT**

The present invention provides a method for controlling a communication parameter in a channel through which data is transmitted between a transmit unit with M transmit antennas and a receive unit with N receive antennas by selecting from among proposed mapping schemes an applied mapping scheme according to which the data is converted into symbols and assigned to transmit signals  $TS_p$ ,  $p=1 \dots M$ , which are transmitted from the M transmit antennas. The selection of the mapping scheme is based on a metric; in one embodiment the metric is a minimum Euclidean distance  $d_{min,rx}$  of the symbols when received, in another embodiment the metric is a probability of error  $P(e)$  in the symbol when received. The method can be employed in communication systems using multi-antenna transmit and receive units of various types including wireless systems, e.g., cellular communication systems, using multiple access techniques such as TDMA, FDMA, CDMA and OFDMA.

55 Claims, 6 Drawing Sheets

